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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/631,857 | 08/01/2003 | Makoto Matsukawa | 107156-00196 | 9151 |

7590 03/16/2006

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| EXAMINER | |
|---|---|
| ANGEBRANNDT, MARTIN J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1756 | |

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/631,857 | MATSUKAWA ET AL. | |
| | Examiner | Art Unit | |
| | Martin J. Angebranndt | 1756 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *1/9/06*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The response of the applicant has been read and given careful consideration. Responses to the arguments of the applicant appear after the first rejection to which they are directed.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 now recites an upper limit of 229 nm for the groove width. This value does not appear to in the specification as originally filed. The applicant must either show a basis for this or remove it in the next response.

Claim 7 recites a lower limit of 331 nm for the groove width. This value does not appear to in the specification as originally filed. The applicant must either show a basis for this or remove it in the next response.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko et al., EP 1148485, in view of in view of Nakai et al. '772 and Nakayama et al. '286.

Abiko et al., EP 1148485 teaches a substrate having corrugated and ridge-and-concavo-convex groove tracks wherein the recording material is a germanium-indium-antimony-tellurium (Ge -In-Sb-Te) alloy material containing 1-6 weight% (wt.%) of Ge, 2-6 wt.% of In, and ratio of Sb to Te is 2.4-3.0 times [0030]. The silver-palladium-copper (Ag-Pd-Cu) reflective alloy material contains 0.9-1.5 wt.% of palladium, and 0.9-1.1 wt.% of Cu [0032]. The examples use a polycarbonate disk, with a track pitch of 0.74 microns, a groove depth of 30-40 nm and a groove width of 300-500 nm, a first dielectric layer having a thickness of 65-80 nm, a 12-18 nm thick $Ge_{1\text{-}6}In_{2\text{-}6}Sb_{(2.4\text{-}3)(x)}Te_x$ layer, a 12-20 nm thick second dielectric layer, an 80-160 nm AgPdCu reflective layer (table 2) The recording layer is used with a 780 nm laser having an NA of 0.55 and is rotated at a velocity of 3.6 to 7.2 m/s. [0047]. The dielectric layer in the examples is ZnS-$SiO_2$ [0023,0036,0039]. Groove depths of 40 nm together with a groove width of 350 nm is optimal as disclosed in table 1 (second sample in table). The use of other materials such as GeOx for the protective layers [0083].

Nakai et al. '772 teaches Ag-Nd reflective layers where at least 0.5-5% of Cu, Au, Pd, Mg, Ti, and/or Ta are added to alloys containing preferably 0.3-2% Nd. Examples use Ag-0.5%Nd-0.9%Cu and 1%Au. [0058] The Nd is described as controlling the crystalline growth in the layer due to reduction of Ag diffusion. This increases the stability of the reflective layer (resistance to humidity) [0046-0050, table 1] The addition of Cu is disclosed as further improving oxidation resistance and maintaining high reflectivity [0051-0052].

Nakayama et al. '286 teaches that the optical recording media substrates, the media preferably has pre-pits and groove depths which are set to be equal in an effort to facilitate easier manufacturing. (26/40-56),28/26-33). Figure 5 shows the formation of pits in the land areas in section 11 to discriminate between the lands and grooves (12/2-20)

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the specific Ag-Nd-Cu (with potentially a Pd additive) reflective film of Nakai et al. '772 in place of the Ag-Pd-Cu film with a undisclosed composition used in the cited example of Abiko et al., EP 1148485 with a reasonable expectation of forming an optical recording media comprising a high-modulated amplitude of the same thickness as specified by Abiko et al., EP 1148485 and to use smaller pitches disclosed, such as 0.35 microns (350 nm) with the embodiment of $10^{th}$ example in table 2 of Abiko et al., EP 1148485 as modified by Nakai et al. '772. Furthermore, it would be obvious to modify the combination of Abiko et al., EP 1148485 and Nakai et al. '772 with the pre-pit described by Nakayama et al. '286 with a reasonable expectation of a lowered cost of manufacturing optical recording media with improved discrimination between the land and groove areas and having improved anti-oxidative properties.

The formation of pits in the land areas is disclosed by Nakayama et al. '286 together with the benefit ascribed to this placement. The phase difference between the lands and the pits or the grooves is optimized to maximize discrimination between them. The physical distance between the pits and grooves is what prevents crosstalk between these, not the identical phase depth. The incorporation of Nakai et al. '772 into the rejection addresses the issue of non-analogous art asserted with respect to Fujii. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the

rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The rejection is based upon a plurality of references, therefore it is clear for the record that one single reference teaches all the embodiments.

The rejections are now based upon Abiko et al., EP 1148485, not Abiko et al. EP 1143430. The applicant may recognize another advantage in forming the prepits to the same depth as the grooves, but fails to appreciate the ease in manufacture as motivation, particularly when the depth is the entire thickness of the photoresist, so the smooth/polished glass surface of the master is the top surface of the lands. The applicant has failed to articulate why Abiko et al. is not congruent with the teachings of Nakai et al. '772 and Nakayama et al. '286 as asserted by the examiner. With respect to the applicants comments, the examiner only meant that a different depth of these pits would translate to a different phase step. If the phase step is the same, then the difference in phase cannot be used to differentiate between theses areas.

With respect to the comments concerning the applicant's analysis of references without discussing their relationship to each other, the examiners points it that discussing the references separately does not address the propriety of the rejection based upon the combination of the references.

6. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abiko et al., EP 1148485 in view of Nakai et al. '772 in view of Nakayama et al. '286, further in view of Miyamoto et al. '565.

The combination teaches the device substantially as claimed however fails to specifically teach the range of pre-pit depth.

Miyamoto et al. '565 teach phase change recording media, where the pre-pits have the same depth as the grooves and are in the range of 40nm to 60nm (see claim 5, 2/37-39).

It therefore would have been obvious to make the phase change optical recording media resulting from the combination of Abiko et al., EP 1148485 with Nakai et al. '772 and Nakayama et al. '286 with the pre-pit depths Miyamoto et al. '565 with a reasonable expectation of forming a low-production cost optical recording media having improved anti-oxidative properties. Examiner further notes that Abiko et al., EP 1148485 teach that the depth of a furrow on the substrate is 30-40 nm, and is therefore congruent with the 40-60 nm taught by Miyamoto et al. '565 as the overlapping 40 nm depths would satisfy the teaching of both Nakayama and Miyamoto et al. '565 in that the prepit depth and the groove depth would be the same.

The applicant's analysis of the prepit areas and the groove/land areas is without merit. The entire raised area is considered land area and the off set from the centerline of the extension of the lands between the grooves is not considered significant. Also the argued point is taught in Nakayama et al. '286. Also Miyamoto teaches that to reduce crosstalk between information in the land and adjacent groove areas of the medium, the track pitch may be increased. (1/44-53), which is the converse of the position articulated by the examiner in the previous office action and meets the request by the applicant on page 11.

7. Claims 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abiko et al., EP 1148485 in view of Nakai et al. '772, Nakayama et al. '286 and Miyamoto et al. '565, further in view of Uno et al., '690.

The combination teaches the claimed device however fails to teach the diffusion prevention layers as claimed by Applicants' claims 5-6. Abiko et al., EP 1 143 430 does,

however, teach that the materials for the dielectric films are preferably ZnS-SiO2 (0023), wherein additionally, other materials such as GeOx may be used for the dielectric film thereby noting a separation between "layers" of dielectric materials (0083, 0023).

Uno et al., '690 teach an optical information recording media comprising a phase change recording layer including Ge, Te and Sb (abstract) wherein the dielectric layers are separated from the recording layer by diffusion preventing layers (7, 8) which preferably contain oxides and/or nitrides including AlN, GeN and SiN exemplified by Abiko (6:41-51). These layers are to prevent a material from diffusing from or into the recording layer (6:52-65,5/26-55). They have thicknesses of at least 1 nm and may be 10 or 20 nm thick, with thicker dielectric layers bordering them on the opposite side from the recording layer. (8/18-28 & 11/10-13). The data in table 1 showews that the presence of a diffusion preventing layer has a positive effect on media lifetime (repetitive recording) and the C/N ratio. (12/17-37).

In addition to the basis provided above, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Abiko et al., EP 1148485 with Nakai et al. '772, Nakayama et al. '286 and Miyamoto et al. '565 by adding the diffusion prevention layers of Uno et al., '690 with a reasonable expectation of forming a useful recording media, which is highly resistive to migration of elements between layers and realizes the benefits ascribed to this including improved stability and C/N ratio. Further, this position is congruent with the teachings of Abiko et al., EP 1148485, which discloses these materials as useful protective layer materials.

8. Claims 1-4 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. '063, in view of in view of Nakai et al. '772 and Nakayama et al. '286.

Yamada et al. '063 teaches example 2, which comprises a GeSbTeGaAg based recording medium with a groove depth of 27 nm and a groove width of 200 nm, a first dielectric layer having a thickness of 75 nm, a 14 nm thick recording layer, a 10 nm thick second dielectric layer, a 3 nm third dielectric layer and an 140 nm AlTi reflective layer [0162-0165]. The use of $(Ag,Ge)_{0.1\text{-}7}(In,Ga,Bi)_{1\text{-}15}Sb_{61\text{-}85}Te_{20\text{-}30}$ is disclosed. [0092-0094]. The reflection layer may be various metals including Ag. [0101]. The upper dielectric may be 70-40 nm and useful dielectric materials including various oxides are disclosed. [0098,0100]. The grooves may be 0.10-0.40 microns wide and 25-50 nm deep. [0084].

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the specific Ag-Nd-Cu (with potentially a Pd additive) reflective film of Nakai et al. '772 in place of the Ag-Pd-Cu film with a undisclosed composition used in the cited example of Yamada et al. '063 with a reasonable expectation of forming an optical recording media comprising a high-modulated amplitude of the same thickness as specified by Abiko et al., EP 1148485 and to use other recording layers compositions, such as those disclosed by Yamada et al. '063 as modified by Nakai et al. '772. Furthermore, it would be obvious to modify the combination of Yamada et al. '063 and Nakai et al. '772 with the pre-pit described by Nakayama et al. '286 with a reasonable expectation of a lowered cost of manufacturing optical recording media with improved discrimination between the land and groove areas and having improved anti-oxidative properties.

Further it would have been obvious to use other groove widths known to be useful with these optical recording media, such as the 0.33 to 0.35 microns widths taught in [0084] of Yamada et al. '063.

9. Claims 1-4 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamada et al. '063 in view of Nakai et al. '772 in view of Nakayama et al. '286, further in view of Miyamoto et al. '565.

It therefore would have been obvious to make the phase change optical recording media resulting from the combination of Yamada et al. '063 with Nakai et al. '772 and Nakayama et al. '286 with the pre-pit depths Miyamoto et al. '565 with a reasonable expectation of forming a low-production cost optical recording media having improved anti-oxidative properties. Examiner further notes that Yamada et al. '063 teach that the depth of a furrow on the substrate is 25-50 nm, and is therefore congruent with the 40-60 nm taught by Miyamoto et al. '565 as the overlapping 40 nm depths would satisfy the teaching of both Nakayama and Miyamoto et al. '565 in that the prepit depth and the groove depth would be the same.

10. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamada et al. '063, in view of Nakai et al. '772, Nakayama et al. '286 and Miyamoto et al. '565, further in view of Uno et al., '690.

In addition to the basis provided above, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Yamada et al. '063 with Nakai et al. '772, Nakayama et al. '286 and Miyamoto et al. '565 by adding the diffusion prevention layers of Uno et al., '690 with a reasonable expectation of forming a useful recording media, which is highly resistive to migration of elements between layers and realizes the benefits ascribed to this including improved stability and C/N ratio. Further, this position is congruent with the teachings of Yamada et al. '063, which discloses these materials as useful protective layer materials.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Martin J Angebranndt
Primary Examiner
Art Unit 1756

03/13/2006